RL78 Family

M3S-SHA-LIB: SHA-1/SHA-256 Library Introduction Guide

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Introduction

This document explains M3S-SHA-LIB: SHA-1/SHA-256 Library for the RL78 Family (hereafter referred to as "SHA-1/SHA-256 Library") that depends on MCUs.

The SHA-1/SHA-256 Library is the software library incorporated in the RL78 series. Also it is designed in dedicated algorithm and fully-tuned up by assembly language. Please refer to the User's Manual to know how to use this software library.

Target Device

RL78 Family

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1. Structure of product

SHA-1/SHA-256 Library comprises the following elements.

1. M3S-SHA-LIB for the RL78 Family V.1.00 Release00E
2. M3S-SHA-LIB for the RL78 Family V.1.00 Release00E Introduction Guide (r20an0211ej0100_rl78_sha.pdf)

Table 1 SHA-1/SHA-256 Library product files

name			Description
Library(lib)			
	sha_rl78.lib		SHA-1/SHA-256 Library file for the RL78 series
	r_sha.h		SHA-1/SHA-256 Library header file
	r_stdint.h		typedef header file
Sample program(sample)			
	sha_RL78_sim_sample		SHA-1/SHA-256 sample program (CubeSuite+ project folder)
Document(doc)			
	en		
		r20uw0101ej0100_sha.pdf	user's manual
		r20an0211ej0100_rl78_sha.pdf	Introduction Guide
	jp		
		r20uw0101jj0100_sha.pdf	user's manual
		r20an0211jj0100_rl78_sha.pdf	Introduction Guide

2. Specification

2.1 API Function

SHA-1/SHA-256 Library for the RL78 supports the following functions.

API	Outline
R_Sha1_HashDigest	Generate a SHA-1 hash digest
R_Sha256_HashDigest	Generate a SHA-256 hash digest

2.2 Version information

User can access SHA-1/SHA-256 Library version information with valuable below.

```
extern const char R_sha_version[];

SHA-1/SHA-256 Library file for the RL78 series
  "M3S-SHA-LIB version 1.00 for RL78.(Oct 18 2012, 15:05:52)"
```

2.3 Section

Section name	Contents	Section Attributes
@@CODEL	program code	CSEG
@@CNST	constant data	CSEG MIRRORP

2.4 SHA-1/SHA-256 Library ROM / RAM / stack size / cycles

2.4.1 ROM/RAM size

library file name	ROM size [byte]	RAM size [byte]
sha_rl78.lib	4396	0

2.4.2 stack size

API	stack size [byte]
R_Sha1_HashDigest	154
R_Sha256_HashDigest	190

Note: stack size is same in all library.

2.4.3 cycles

API	time [us] @ system clock = 32MHz / message length = 64 byte
R_Sha1_HashDigest	1336
R_Sha256_HashDigest	2020

2.5 Development environment

Host OS

Please use one of the following OSs:

- Windows XP (32-bit only), Windows Vista, or Windows 7

Renesas Toolchain Requirements

Please use the same or a later version of the toolchain listed below:

- Integrated Development Environment:
  CubeSuite+ V1.02.01
- C compiler:
  CA78K0R V1.41

2.6 Compiler option for generating library

Libraryfile is built with the following options.

```
-qx2 -dLITTLE_ENDIAN -common -zps -mm -mi0 -aDefaultBuild -no –ng -nga
```

3. Limitations

- This library is an object for "medium models."
- The pointer of a variable with a __far instruction modifier cannot be specified as an argument.

Website and Support

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http://www.renesas.com/

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Revision Record

		Description	
Rev.	**Date**	**Page**	**Summary**
1.00	Oct 18, 2012	—	First edition issued

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

1. Handling of Unused Pins
   Handle unused pins in accord with the directions given under Handling of Unused Pins in the manual.
   — The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.
2. Processing at Power-on
   The state of the product is undefined at the moment when power is supplied.
   — The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.
   In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.
   In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.
3. Prohibition of Access to Reserved Addresses
   Access to reserved addresses is prohibited.
   — The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.
4. Clock Signals
   After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.
   — When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.
5. Differences between Products
   Before changing from one product to another, i.e. to one with a different type number, confirm that the change will not lead to problems.
   — The characteristics of MPU/MCU in the same group but having different type numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different type numbers, implement a system-evaluation test for each of the products.

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